#11

PATENT 9/29/03

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Martin Baumann et al.

Serial No.: 10/021,558

Filed: December 12, 2001

Title: SUBSTRATES WITH A SELF-CLEANING SURFACE, A PROCESS FOR THEIR PRODUCTION AND THEIR USE

Examiner: C. Paulraj Art Unit: 1773

Docket No.: FER-12790 Conf. No.: 9291

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT "C"

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

1. Pursuant to 37 C.F.R. 1.97 and 1.98, and in compliance with 37 C.F.R. 1.56, the Office's attention is directed to the patents, publications and other information listed on the attached PTO-SB-08A. A copy of each listed document is enclosed except for: (a) pending applications or (b) those previously cited or submitted to the Office in the following application(s) upon which this application relies for an earlier filing date under 35 U.S.C. 120:

Serial No.:
Filing Date:

Regarding any document, publication or other information for which a date is not given on the attached PTO-SB-08A, Applicant(s) believe(s) the same may qualify as "prior" art to this application and should be treated accordingly, although Applicant(s) reserve(s) the right to contest the prior art status of any document, publication or information, should issue arise.

2. Regarding each listed document that is not in the English language, an English-language translation accompanies this Statement as indicated on the attached PTO-SB-08A or a concise explanation of the relevance of the document is set forth in the following document(s):

(a) ___ Copy of each English language version of a search report indicating the degree of relevance found by the foreign office of each document being submitted from the search report.

(b) _X_ Attachment entitled "Concise Explanation of Relevance of Non-English Language Documents".

3. Pursuant to 37 C.F.R. 1.97(b) this Statement is being filed (one must be checked):
(a)___ Within 3 months of the filing date or date of entry into the National Stage.

(b) ___ Before the mailing date of a first Office Action on the merits. If this Statement is not filed before the mailing date of a first Office Action on the merits, the required certification is given below or, in the absence thereof, the Office is authorized to charge the required fee set forth in 37 C.F.R. 1.17(p) to Deposit Account No. 060625 consideration of this Statement.

(c) _X_ After the period set forth in 37 C.F.R. 1.97(b) but before the mailing date of either a final action or a notice of allowance.

(1) ___ The required certification is given below, or

(2) __ Enclosed is a check covering the fee set forth in 37 C.F.R. 1.17(p) for consideration of this Statement, or

(3) _X_ Charge the fee set forth in 37 C.F.R. 1.17(p) to Deposit Account No. 060625.

(d) ___ After the mailing date of either a final action or a notice of allowance, but before payment of the issue fee. Petition hereby is made for consideration of this Statement and the required certification is indicated below.

(1) ___ Enclosed is a check covering the fee set forth in 37 C.F.R. 1.17(i)(1), or

(2) ___ Charge the fee set forth in 37 C.F.R. 1.17(i)(1) to Deposit Account No. 060625.

4. Certification (if applicable)

(a) ___ The undersigned hereby certifies that each item of information contained in this Statement was cited in a communication from a foreign patent office in a counterpart foreign application not more than 3 months prior to the filing of this Statement.

(b) ___ The undersigned hereby certifies that no item of information contained in this Statement was cited in a communication from a foreign patent office in a counterpart foreign application or, to the undersigned's knowledge after making reasonable inquiry, was known to any individual designated in 37 C.F.R. 1.56(c) more than 3 months prior to the filing of this Statement.

5. The Commissioner is hereby authorized to charge any additional fees or credit any overpayment to Deposit Account No. 060625.

Respectfully submitted,

RANKIN, HILL, PORTER & CLARK LLP

By _____
Kenneth A. Clark, Reg. 32,119
Randolph E. Digges, III, Reg. No. 40,590
Shawn A. McClintic, Reg. No. 45,856
Attorneys for the Applicant

700 Huntington Building
925 Euclid Avenue
Cleveland, Ohio 44115-1405
(216) 566-9700
Customer No. 007609

CERTIFICATE OF MAILING UNDER 37 C.F.R. §1.8

I hereby certify that this correspondence (along with any paper referenced as being attached or enclosed) is being deposited on the below date with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to Assistant Commissioner for Patents, Washington, D.C. 20231.

Name: Lori L McCormick

Date: 9/8/03

#10
9/29/03
12

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Martin Baumann et al.

Serial No.: 10/021,558

Filed: December 12, 2001

Title: SUBSTRATES WITH A SELF-CLEANING SURFACE, A PROCESS FOR THEIR PRODUCTION AND THEIR USE

Examiner: C. Paulraj Art Unit: 1773

Docket No.: FER-12790 Conf. No.: 9291

STATEMENT OF RELEVANCE OF NON-ENGLISH LANGUAGE REFERENCES

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This statement is filed with Amendment "A" and the supplemental information disclosure statement "C" enclosed herewith.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop Non-Fee Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date indicated below.

Lorie L. McCormick
Printed Name of Person Mailing Paper

8/8/03 Lorie L McCormick
Date Signature of Person Mailing Paper

The non-English references discussed herein are:

EP 0 748 775

EP 1 075 867

EP 0 684 075

EP 0 933 388

DE 199 45 513.9

DE 199 46 280.1

DE 199 41 753.9 (from which WO0118135 claims priority)

DE 100 59 487

DE 100 18 223.2

WO 01/17694 (which claims priority to DE 100 18 233.2)

WO 01/40394

WO 03/013827

WO 96/04123

The references EP 0 658 525; EP 0 748 775; EP 1 075 867; EP 0684 075 were cited in the corresponding International search report. Specifically, EP 0 658 525 and EP 0 748 775 were designated with an "X", and EP 1 075 867 and EP 0684 075 were designated with a "Y." A copy of the Search Report is attached hereto. EP 0 658 525 has an English language equivalent U.S. Pat. No. 5,674,625 and is therefore not discussed herein.

EP 0 933 388

Discloses a surface having projections with a mean height and mean spacing of 50 nm -10 microns. The surface energy of the unstructured material is 10-20 mN/m. The surface has projections with a mean height and mean spacing of 50 nm -10 microns. The surface energy of the unstructured material is 10-20 mN/m. Also disclosed is a method for producing the structured surfaces, in which the projections are mechanically impressed, lithographically etched or machined into a material with low surface energy and a use of the structured surface for manufacturing products with little or no affinity to polar or non-polar fluids.

DE 199 45 513.9

Discloses a device equipped with an easy to clean surface. The surface has a stochastic structure formed by a coating, a "Randwinkel" (border angle) of about 65 degrees and/or a surface energy of less than 35 mJ/m^2. Further, the coating can contain particles, the size of the particles lies above the medium thickness of the coating. The particle sizes can lie 2 to 20 times above the medium coating thickness, but there is no explicit mention of particle size. Also disclosed are the use of fluorinated moieties, i.e., silanes, for applying a surface coating (page 6, para 2).

DE 199 46 280.1

Discloses a method for coating surfaces with thin coats of a fluorine containing moiety, thus rendering the surface hydrophobic. A structurization of the surface is not mentioned. The method can be described as a vaporization of the moiety / the composition containing the moiety followed by a condensation and polymerization or linking of molecules of the coating building moieties on a surface they are applied to.

DE 199 41 753.9

Discloses plane glass, ceramics and enameled steel coated with a hydrophobic coating on the substrate (page 11, lines 1-17). The material used for the manufacture of the coating can contain pigments or other additives (page 9, line 31). Structure building particles with a certain diameter (e.g., of less than 100 nm) are not explicitly mentioned. A hydrophobization of a structured surface is not described.

DE 100 59 487

The abstract discloses a coating composition obtained by the hydrolysis and polycondensation of organosilanes with hydrolyzable groups or hydroxyl groups in presence of: (a) nano-scale silicon dioxide particles and/or (b) oxides and/or hydroxides of alkali and alkaline earth metals for producing a vitreous coating on a metal surface. Special coating compositions are used for the production of vitreous coatings on metallic surfaces. The compositions are

obtained by the hydrolysis and polycondensation of silane(s) of the formula R_nSiX_{4-n} or their oligomeric derivatives. Where X is a hydrolyzable group or a hydroxyl; R is Hydrogen, alkyl, alkenyl or alkynyl groups with up to 4 carbon atoms, or aryl, aralkyl or alkaryl groups with 6-10 carbons; n = 0, 1 or 2, with the proviso that at least one silane with n = 1 or 2 is used in the presence of: (a) nano-scale SiO2 particles and/or (b) oxide(s) and/or hydroxide(s) of alkali and alkaline earth metals.

DE 100 18 223.2

Discloses a coating of substrates resulting in a stochastically structured and hydrophobic coating (page 2, lines 25-32), wherein the coating may be applied to surfaces by using inorganic structure building particles in the form of a "nanopowder." (page 2, line 62). Further, Si moieties, preferably silanes, alkoxysilanes and siloxanes may be added which in turn lower the melting point of the structure builder. These moieties may be applied to substrates within a flame, and which is applied to a surface to be coated that is heated subsequently. Possible additive are B-, Ti-, Alkali-metal and/or Zr-containing moieties, to include Boron Ethoxide and Alkoxides in general. Structure building particles are added to the flaming gases prior to application of the flame to the surface. (page 2, lines 51-67). A SiO_2 structure results from the flaming.

A coating is made by structuring via reactive gas flaming in which 15 g of trimethoxysilane is flamed onto a plane window glass to form a translucent SiO_2 structure, which is then hydrophobized via condensation fluoroalkyltriethoxysilane and dimethyldiethoxysilane on the structured surface. It is not clear whether the structure formed on the surface consists of particle or a continuous network of structural subunits (page 4, lines 19-32).

In the claims of the reference, a process is defined consisting of structurization followed by application of a coating which has a contact angle to oils and water of 65 degrees and a surface energy of less than 35 mJ/m^2. Also, spraying and dipping methods are disclosed.

Substrates are disclosed that include glass, plastic, metal, ceramic (tiles), SiO_2, and photovoltaic elements. A typical coating thickness elevation is in the range of 0.3 micrometers to 0.6 micrometers (page 3, line 28).

PCT Application No. WO 01/17694 (claims priority to DE 100 18 233.2)

Discloses a coating of substrates resulting in a stochastically structured and hydrophobic coating (page 2, lines 20-32), wherein the coating may be applied to surfaces by using inorganic structure building particles in the form of a "nanopowder." (page 4, line 33). Further, Si moieties, preferably silanes, alkoxysilanes and siloxanes may be added which in turn lower the melting point of the structure builder. These moieties may be applied to substrates within a flame, and which is applied to a surface to be coated that is heated subsequently. Possible additive are B-, Ti-, Alkali-metal and/or Zr-containing moieties, to include Boron Ethoxide and Alkoxides in general. Structure building particles are added to the flaming gases prior to application of the flame to the surface. (page 4, line 11 and page 5, line 12). A SiO_2 structure results from the flaming.

A coating is made by structuring via reactive gas flaming in which 15 g of trimethoxysilane is flamed onto a plane window glass to form a translucent SiO_2 structure, which is then hydrophobized via condensation of fluoroalkyltriethoxysilane and dimethyldiethoxysilane on the structured surface. It is not clear whether the structure formed on the surface consists of particle or a continuous network of structural subunits (page 11, lines 1-31).

In the claims of the reference, a process is defined consisting of structurization followed by application of a coating which has a contact angle to oils and water of 65 degrees and a surface energy of less than 35 mJ/m^2. Also, spraying and dipping methods are disclosed.

Substrates are disclosed that include glass, plastic, metal, ceramic (tiles), SiO_2, and photovoltaic elements. A typical coating thickness elevation is in the range of 0.3 micrometers to 0.6 micrometers (page 7, lines 19-20). On page 6, lines 7-10, "Alternatively a sufficient porosity (structure) may be obtained in another way, e.g. by applying a preburned, milled ceramic mass to a yet unburned (green) ceramic body."

WO/01/40394 (claiming priority to DE 199 58 336.6)

Discloses a substrate with self-cleaning surfaces, substrates comprising hydrophobic coatings containing particles, and means and a process for the manufacture of such coatings. Particles are described having particles sizes of

below 1000, 200, 100 and 70 nanometers. Preferred particles size ranges are listed as from 1 to 100 nm, 2 to 50 nm and 5 to 40 nm. Inorganic particles may consist of any material, preferably of metals or metal oxides, chalcogenides, halogenides, etc., among other SiO_2, Al_2O_3, ZrO_2 and SnO_2.

Silanes Z_3SiR are disclosed as a layer forming material, where Z is a hydrolysable group, e.g. OR' and R is a non-hydrolysable group that contains an electrophilic group X or contains a nucleophilic group Y (like OH). These materials seem to form structural elements like e.g. –Si-R''-Si- with R'' not equal to Oxygen. Particle described may be pretreated to form bonds with the coating material surrounding the particles in the final coating layer, e.g. with alcohols or hydrolysable silanes containing at least one non-hydrolysable group R. It is not clear whether Si-O-Si may be formed between coated particles (e.g. in case of SiO_2 as particle) and the material which they are embedding.

A wet coating thickness is disclosed that is between 10 micrometers and 100 micrometers and final coating thickness of between 0.5 micrometers and 50 micrometers. Coating compositions are prepared from two components A and B, wherein A is a coating material and B is a particle. The mass ratio of components A and B in Example 2 corresponds to 2.421 solvents not taken into account. A component C may be added to component A, component C can be described as a coating material. 1.005 to 1.05 moles of components A and C are combined with 0.2 to 2.0 moles of "nanoscaled" inorganic solid particles. This corresponds to a ratio of material to particles of between 5:1 and 1:2 (mole ratio).

Choosing as component A 1.0 mole of GPTS (glycidyloxypropyltrimethylsilane; molar mass of 239.4), component C 0.005 moles of FTS (1,1,2,2 Perfluorooctyltriethoxysilane; molar mass of 519.29), and component B 2 moles of CeO_2 (molar mass of 172.114) the weight ratio calculates out to 1:2.42 of material to particles, solvents are not taken into account.

With reference to substrates, metal, glass, ceramic, and plastic materials are disclosed. The coatings are described as transparent and colorless. The materials used for forming the coating can contain Si, but not as SiO_2, except where the particles are SiO_2. The coating is applied to substrates in one single step and consequent hydrophobization and structuring of the substrate surface take place simultaneously, rather than sequentially.

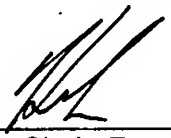
WO 03/013827 (claims priority to DE 101 38 036.4)

Disclosed in Figs. 1-3 are surfaces having a structure of nanometer-sized elevations. The abstract refers to lotus effect surfaces.

WO 96/04123

The abstract discloses a self-cleaning surface of a substrate; the surface has a structure consisting of elevations and depressions. The elevations and depressions have a height of from 5 to 100 micrometers and the elevations are made of a hydrophobic polymer.

Respectfully submitted,
RANKIN, HILL, PORTER & CLARK LLP



Kenneth A. Clark, Reg. 32,119
Randolph E. Digges, III, Reg. No. 40,590
Shawn A. McClintic, Reg. No. 45,856
Attorneys for the Applicant

925 Euclid Avenue
Suite 700
Cleveland, Ohio 44115-1405
(216) 566-9700
Customer No. 007609